



AFRICA RISING - Enhancing partnership among Africa RISING, NAFKA and TUBORESHE CHAKULA Programs for fast tracking delivery and scaling of agricultural technologies in Tanzania

Annual Report (1 October 2014–30 September 2015)



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IITA – International Institute of Tropical Agriculture

Annual Report

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Thematic Implementing Partners:

AfricaRice – Rice

AVRDC – Vegetables

CIMMYT – Maize

IITA – Postharvest and Nutrition

COVER PHOTO

One of the project beneficiaries admiring drought tolerant maize variety NATA HI05 in Dodoma region (Phot credit: Elirehema Swai/ARI Hombolo)

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LIST OF ACRONYMS

ASA	Agricultural Seed Agency
AfricaRice	Africa Rice Center
Africa RISING	Africa Research in Sustainable Intensification for the Next Generation
ARI	Agricultural Research Institute
AVRDC	The World Vegetable Center
CIAT	International Center for Tropical Agriculture
CIMMYT	International Maize and Wheat Improvement Center
COUNSENUTH	Center for Counseling, Nutrition and Health Care
DAICO	District Agriculture, Irrigation and Cooperative Officer
FtF	Feed the Future
GAP	Good Agronomic Practices
GIS	Geographical Information Systems
HORTI Tengeru	Horticultural Research and Training Institute-Tengeru
ICRAF	The World Agroforestry Center
IITA	International Institute for Tropical Agriculture
IPM	Integrated pest management
KATRIN	Kilombero Agricultural Training and Research Institute
MaWaKi	Maendeleo ya Watu wa Kilolo
MEF	Monitoring and Evaluation Framework
MUST	Mbeya University of Science and Technology
NAFAKA	Tanzania Staples Value Chain Activity (USAID FtF Project)
R4D	Research for Development
TUBOCHA	Tuboreshe Chakula (USAID FtF Project)
USAID	US Agency for International Development
VBAA	Village-based Agricultural Agent
ZoI	(FtF) Zone of Influence

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I EXECUTIVE SUMMARY

Project background and objectives: The Africa RISING–NAFAKA partnership scaling focuses on testing and delivery of promising interventions that enhance agricultural productivity in Tanzania. The key interventions include introduction of improved crop varieties, dissemination of best-bet crop management packages, rehabilitation and protection of natural resources, and postharvest management. The project focus is on three crop enterprises—maize, rice, and vegetables with postharvest handling and nutrition as a cross-cutting theme. Legumes are also promoted as a means of better natural resource management. The key partners in the project include international agricultural research centers (IITA, CIMMYT, CIAT, and ICRAF) for maize and postharvest management; AfricaRice for rice; the World Vegetable Center (AVRDC) for vegetables; and two USAID-funded projects under the Feed the Future Initiative in Tanzania—NAFAKA and TUBOCHA. These work in partnership with national institutions (research and universities) as well as local government authorities, the private sector (seed companies, millers, and processors), and NGOs to deliver on the strategic objective of increasing the productivity of key value chains in Tanzania and the following objectives: (i) Promoting improved and resilient varieties of food crops to farm households in a manner that sustainably improves their livelihoods; (ii) Disseminating best-bet agronomic management packages around the most promising new crop varieties; (iii) Protecting land and water resources and fostering agricultural biodiversity; (iv) Promoting postharvest management for all and household nutrition for the most vulnerable households; and (v) Offering and expanding capacity services to members of grassroots farmers' associations, platform partners, and development institutions in the scaling process.

Project locations: During the past year, project activities were implemented in Tanzania in the regions of Manyara, Dodoma, and Morogoro, with extension to Iringa and Mbeya planned in year 2, all in the FtF's Zone of Influence (Zol).

Activities and results: The key project activities included demonstration of improved maize, vegetable, and legume varieties in 35 selected villages across the five districts. In addition to improved crop varieties, Good Agricultural Practices (GAP) were applied in all villages. Natural resource management practices such as planting of legumes with maize and use of tie ridges and rippers to manage soil and water resources especially in semi-arid locations were promoted. In promoting these practices the scaling model used involves training farmers who will train others in the subsequent year of the project.

All the improved varieties of maize and vegetables performed better than local varieties in all demonstration plots. However, the improved varieties did not perform to their potential due to poor rains and severe drought in most locations. All the demos have since been harvested but the data will not have been conclusively analyzed by the end of this year; nevertheless, it will be useful in guiding the joint selection of varieties with farmers for the next year of the project.

The rice component is additionally developing two weed management strategies—a motorized weeder and an IT based weed management advice tool. By the end of the first year, work on design

of the prototypes that will lead to improved weed management was being finalized. Under postharvest management, training activities for farmers on postharvest handling of maize (shelling, drying, storage, and processing of maize was done, targeting 77 farmers in three regions (Morogoro, Dodoma, and Manyara). There is high enthusiasm from farmers on use of the technologies.

As a means of sharing project results with participating farmers and other stakeholders, field days are a key feature of the project. In the past year, ten field day sessions were organized for maize and vegetable activities targeting 1586 stakeholders. In all cases, local government staff, research staff from agricultural research institutes, input dealers, and the media attended as a sign of support for the project activities and a strategy for scaling and sustainability.

For community empowerment purposes, the project works with NAFKA as a scaling platform. The NAFKA project has developed a vibrant network of farmers' groups and associations, farmer trainers (VBAs and lead farmers), local development organizations, private sector actors, and input suppliers with which the project works. Innovation platforms are also part of the project focus. However, only the rice team managed platforms during the past year with other teams planning to do so from the second year onwards.

Challenges and lessons learned: The key challenges faced by the project included: (i) the time-restrictive nature of project activities in terms of meeting the necessary institutional requirements and logistical preparations for technology delivery with a fast approaching rainy season. This caused problems with respect to some project partners planning and working together due to the short time between approval of the project and starting of the planting season; (ii) the absence of NAFKA (the scaling platform partner in the project) in some project locations (Kilosa and Babati districts). The solution was to work with the district agriculture offices and seed supply companies to co-manage the demos with farmers as well as train farmers. The commitment of these two institutions was satisfactory with room for improvement; (iii) the TUBOCHA project ended in June 2015 leaving a gap with respect to the postharvest management component; (iv) poor rain distribution which affected performance of the demonstration plots; and (v) in some project locations, the relatively poor group governance and dependency syndrome affected project execution.

Planned activities for next year: The planned activities include: (i) selection of sites for the new project locations in Mbeya and Iringa regions and establishment of project demonstration sites as well as farmer training in these locations; (ii) meetings—community sensitization meetings, stakeholders' meeting, review and planning meetings, and project management team meetings will be held at appropriate dates to ensure smooth project implementation; (iii) training of farmer trainers (both village based and partner organizations) in specific subjects to ensure quality project implementation; (iv) conducting farmer field days and exchange visits, (v) conducting studies—baseline in the new project locations, adoption and spillover studies in old locations; (vi) formation of R4D/Innovation platforms to ensure swift and timely action on issues that facilitate or hamper scaling of the agricultural productivity interventions; (vii) developing prototypes for the weeder and weed management advice tool; (viii) developing and distributing reference materials for the trainers and trainees; and (ix) mainstreaming GIS technologies in the project activities.

Budget: The available budget for the reporting period was USD2, 200,000 and the actual expenditure was approximately USD2, 015,000.

2 SUMMARY TABLE OF PROJECT INDICATORS

The table below shows a summary of project indicators. As indicated, 40% of farmers are applying technologies and only 5% of rice hectares are under improved technologies. These being outcome indicators, performance is expected to immensely increase during the next year. For other indicators which are output oriented, 133.2% of individuals have received food security training, 59% of private enterprises and farmers' organizations are receiving USG assistance, 176.2% of rural households are benefiting, and over 300% of target households have home gardens as a result of this project. For all the achievements that are over 100% the results are largely attributed to activities of the vegetable and maize teams whose approach involves training farmers and giving them seed kits.

Indicator	FY Target	FY Achievement	% Achievement	% Female	% Male
1. Number of farmers and others who have applied new technologies or management practices as a result of USG assistance	625	252	40	53.2	46.8
2. Number of rice hectares under improved technologies or management practices as a result of USG assistance	580	30	5.1		
3. Number of individuals who have received USG supported short-term agricultural sector productivity or food security training	725	966	133.2	39.6	60.4
4. Number of food security private enterprises (for profit), producers organizations, water users associations, women's groups, trade and business associations, and community-based organizations (CBOs) receiving USG assistance	71	42	59		
5. Number of rural households benefiting directly from USG interventions	775	1366	176.2	44.9	55.1
6. Number of beneficiaries with home gardens or alternate crops as a proxy for access to nutritious foods and income	149	797	534.9	44.2	55.8

3 INTRODUCTION

3.1 Project description

During the past year, Africa RISING partners have been involved in testing and delivery of promising interventions than enhance agricultural productivity. The interventions in this project include the introduction of improved crop varieties, dissemination of best-bet crop management packages, rehabilitation and protection of natural resources, and postharvest management. Details are available at the project link, http://africa-rising.wikispaces.com/AR_NAFAKA_TUBOCHA_Project.

The project focus is on three crop enterprises—maize, rice, and vegetables with postharvest handling and nutrition as a cross-cutting theme. Legumes are also promoted as a means of better natural resource management. The key partners in the project include international agricultural research centers (IITA, CIMMYT, CIAT, and ICRAF) for maize and postharvest management; AfricaRice for rice; the World Vegetable Center (AVRDC) for vegetables; and two USAID-funded projects under the Feed the Future Initiative in Tanzania—NAFAKA and TUBOCHA. (Note: the TUBOCHA project ended in June 2015 although the project interventions build on its achievements). These works in partnership with national institutions (research and universities) as well as local government authorities, the private sector (seed companies, millers, and processors), and NGOs to deliver on the following objectives:

- Introduce and promote improved and resilient varieties of food crops to farm households in a manner that complements their ongoing farm enterprises, contributes to sustainable agricultural resource management, and offers nutritional advantages and alternative market channels.
- Disseminate best-bet agronomic management packages around the most promising new crop varieties suited to widely representative agro-ecological zones and market proximity.
- Protect land and water resources and foster agricultural biodiversity through the introduction of soil and water management practices.
- Increase food security and improve household nutrition among the most vulnerable households and their members, especially women and children, by introducing locally adapted and nutrient-rich vegetables.
- Introduce and promote postharvest management technologies for maize, rice, legumes, and selected vegetable crops to reduce losses and bring quality up to market standards.
- Offer and expand capacity services to members of grassroots farmers' associations, platform partners, and development institutions in the scaling process (capacity building), paying particular attention to the special opportunities available to women farmers as technical and nutritional innovators and resource managers.

3.2 Geographic Zones of Influence

During the first project year, activities were conducted in the regions of Manyara, Dodoma, and Morogoro, with extension to Iringa and Mbeya planned in year 2, all in the FtF's Zol (Fig. 1). Action sites were selected according to the following criteria:

- The districts and villages were selected based on agroecological characteristics that are suitable for the selected technologies as well as availability of suitable partners.
- In addition, the siting of demonstration plots for learning was guided by a combination of visibility, accessibility, and land suitability.

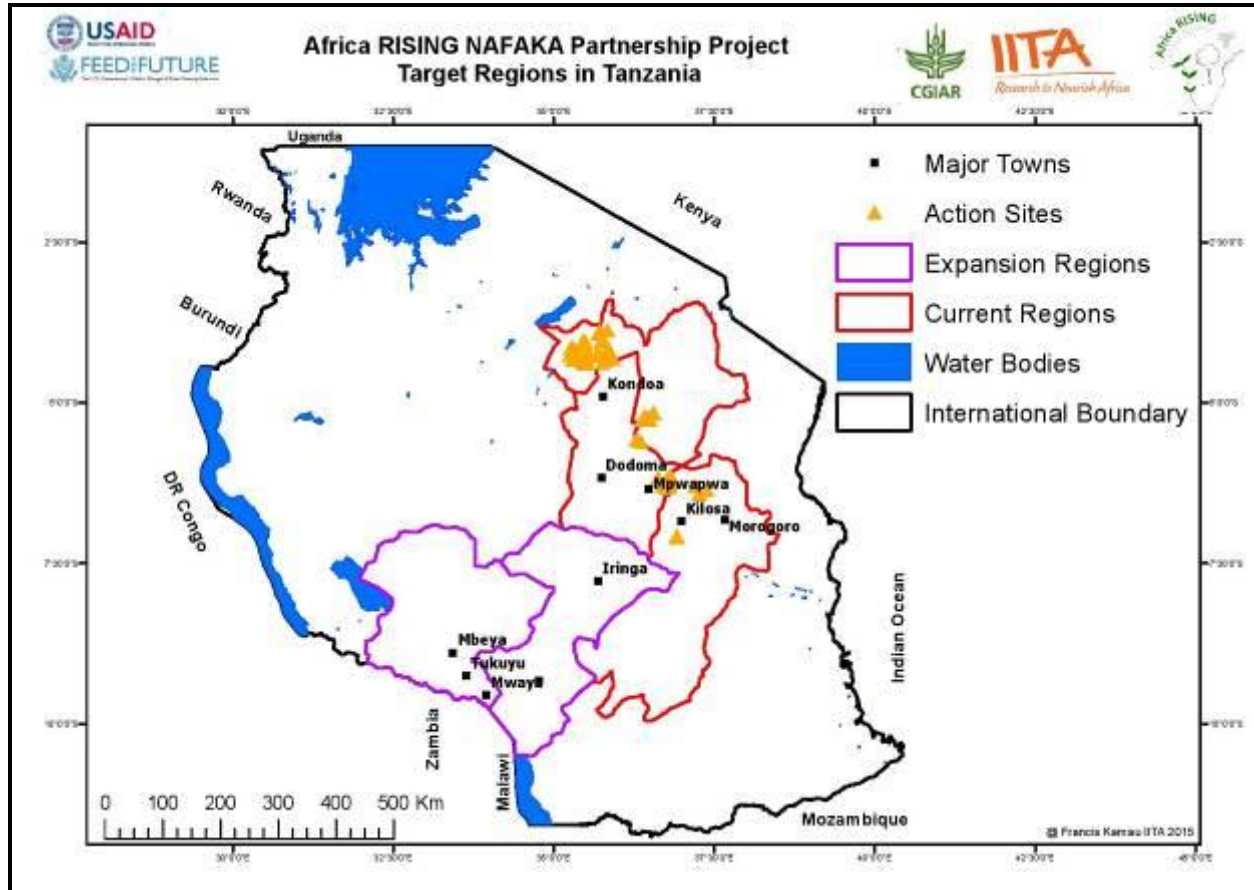


Figure 1: Project target regions in Tanzania

4 IMPLEMENTATION PROGRESS

All project activities address the strategic objective of increasing agricultural productivity and profitability in targeted value chains.

4.1 Demonstration of improved maize and legume technologies and management practices

Improved maize and legume varieties were promoted in 29 selected villages across the five districts (Table I).

Table I: Improved maize and legumes established at demonstration sites for scaling

District			
Babati	Village	Maize Hybrid	Legumes
	Seloto-1	MAMH913 and TZH538	
	Seloto-2	TZH538 and TZH536	
	Seloto-3	TZH536 and MAH913	
	Halu-1	TZH536 and SC 627	
	Halu-2	TZH538 and TZH536	
	Matufa	TZH536 and SC 627	
	Eyamango	MERUHB513	Beans- Uyole Njano
	Orng'adida	MERUHB513	Beans- Uyole Njano
	Duduye	MERUHB513	Beans- Uyole Njano
	Eyesam	MERUHB513	Beans- Uyole Njano
	Sangara	MERUHB513	Beans- Uyole Njano
Kongwa	Ndurugumi	NATAK6Q	Groundnut pure stand-Mnanje and Pendo
	Chang'ombe	NATAK6Q	Groundnut pure stand-Mnanje and Pendo
	Vihingo	NATAK6Q	Groundnut pure stand-Mnanje and Pendo
	Ndalibo	NATAK6Q	Groundnut pure stand-Mnanje and Pendo
	Lengaji	NATAK6Q	Groundnut pure stand-Mnanje and Pendo
Kiteto	Esuguta	NATAH105	
	Ngipa	NATAH105	
	Mbigiri	NATAH105	
	Kaloleni	NATAH105	
	Kiperesa	NATAH105	
Kilosa	Ng'ole	TAN H600 and NATA 104	Cowpea (Vuli II)
	Ulaya	TAN H600 and NATA 104	Cowpea (Vuli II)
	Kitete	TAN H600 and NATA 104	Cowpea (Vuli II)
	Mandela	TAN H600 and NATA 104	Cowpea (Vuli II)
	Maguha	TAN H600 and NATA 104	Cowpea (Vuli II)
Mvomero	Kwadoli	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Dihombo	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Chigugu	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Msufini	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Lukenge	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Hoza	NATAK6Q	Soybean-Line 8 and beans Uyole Njano

In addition to improved crop varieties, Good Agricultural Practices (GAP) were applied in all villages, which included timely planting, timely weed management, timely fertilizer application, and timely thinning to maintain the recommended plant population. For natural resource management, legumes were planted either as intercrop (beans and cowpea in Babati) or as a pure stand close to maize (groundnut in Kongwa or cowpea in Kilosa) to provide advantages of adding nitrogen to the soil through nitrogen fixation. Tie ridges were also promoted in all districts to demonstrate the need for soil and water conservation.

Generally, in terms of performance, improved varieties performed better than local varieties in all demo sites. However, the improved varieties did not perform to their potential due to poor rains and severe drought in most locations. All the demos have since been harvested.



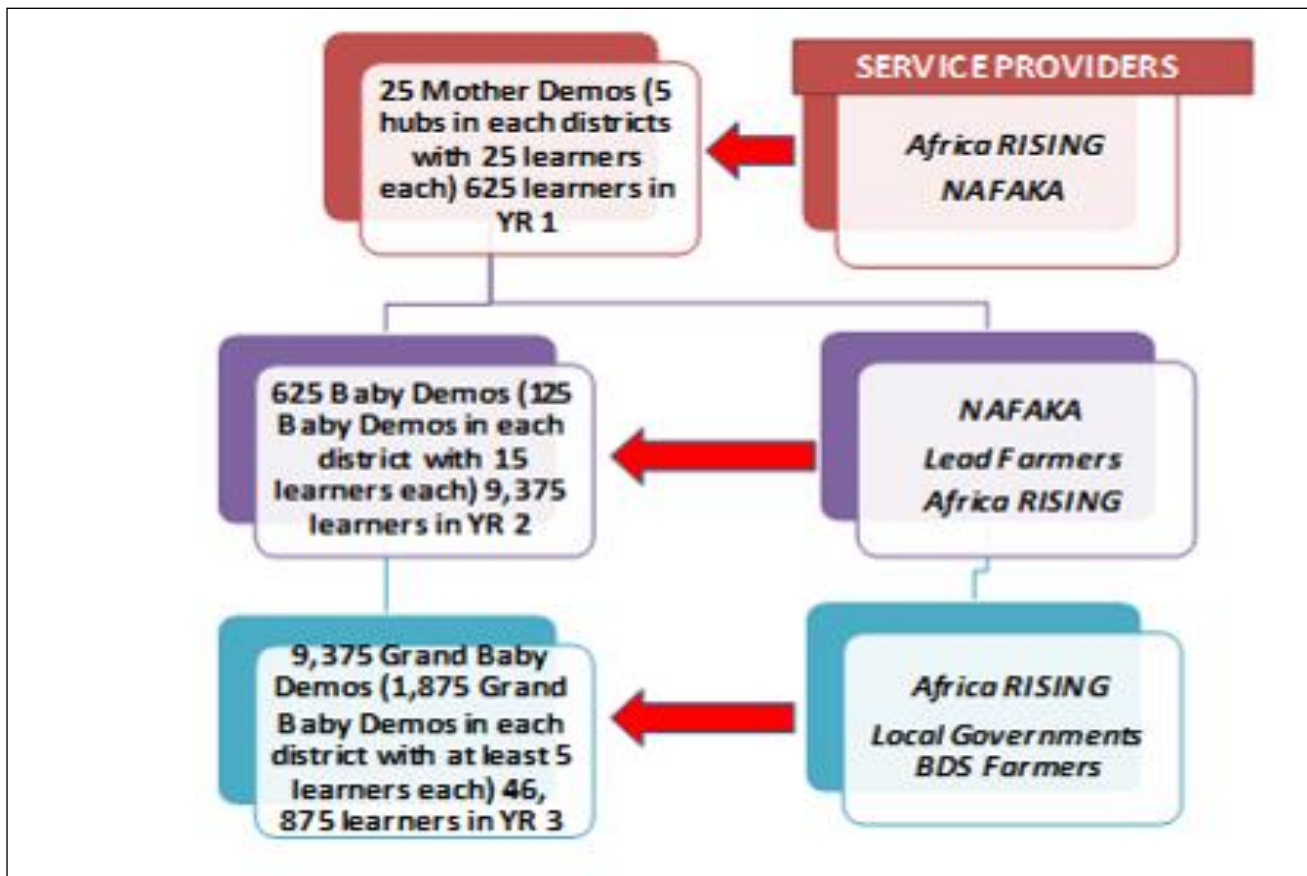
Maize crop affected by drought in Ngipa Village, Kiteto District



Project maize demonstration in same location (Ngipa Village) under drought conditions

(Photo credits: Jumbo Bright/CIMMYT)

In preparation of the second cropping season in the second year, at least 25 baby demonstration plots will be established per hub (village or ward), with each 15 attracting 15 learners. The model being followed as indicated in the project proposal is shown in Figure 2. Preliminary meetings with the farmers to prepare them for establishment and management of the 25 baby demonstration plots per hub have been organized and additional training will be held at the beginning of the second project year before the beginning of the farming season.



4.2 Demonstration of rice management practices

Under rice, the main activities have been on development of two weed management strategies—a motorized weeder and an IT based weed management advice tool. Project activities were implemented in Morogoro Region in the districts of Kilombero (Msufini, Idete, Lungongole, Kiberege, Lumemo, Michenga, and Sagamaganga villages) and Mvomero District (Wami-Dakawa). The rice team also reported working on the same issues in other regions of Tanzania but they are not reported here because they are out of scope for the approved project regions. For the weeder, farmer participatory demonstrations of three models of motorized paddy weeders—a single-row and double-row type from India and a double-row type from Japan—were conducted at two weeding times with an average 25 farmers, per site per demonstration. A hand-operated straight spike floating weeder was also included to enable farmers to compare the performance and ease of operation of the motorized weeders with a manual weeder. Apart from the rice farmers, researchers of the national research centers, agricultural extension officers, community development officers, local blacksmiths, NAFKA staff, and representatives from the local governments and NGOs participated. By the end of the first year, work on design of the prototype that will lead to improved weed management was being finalized.



Farmers in Ifakara, Morogoro Region trying out the different rice weeders

(Photo credit: Jonne Rodenburg/AfricaRice)

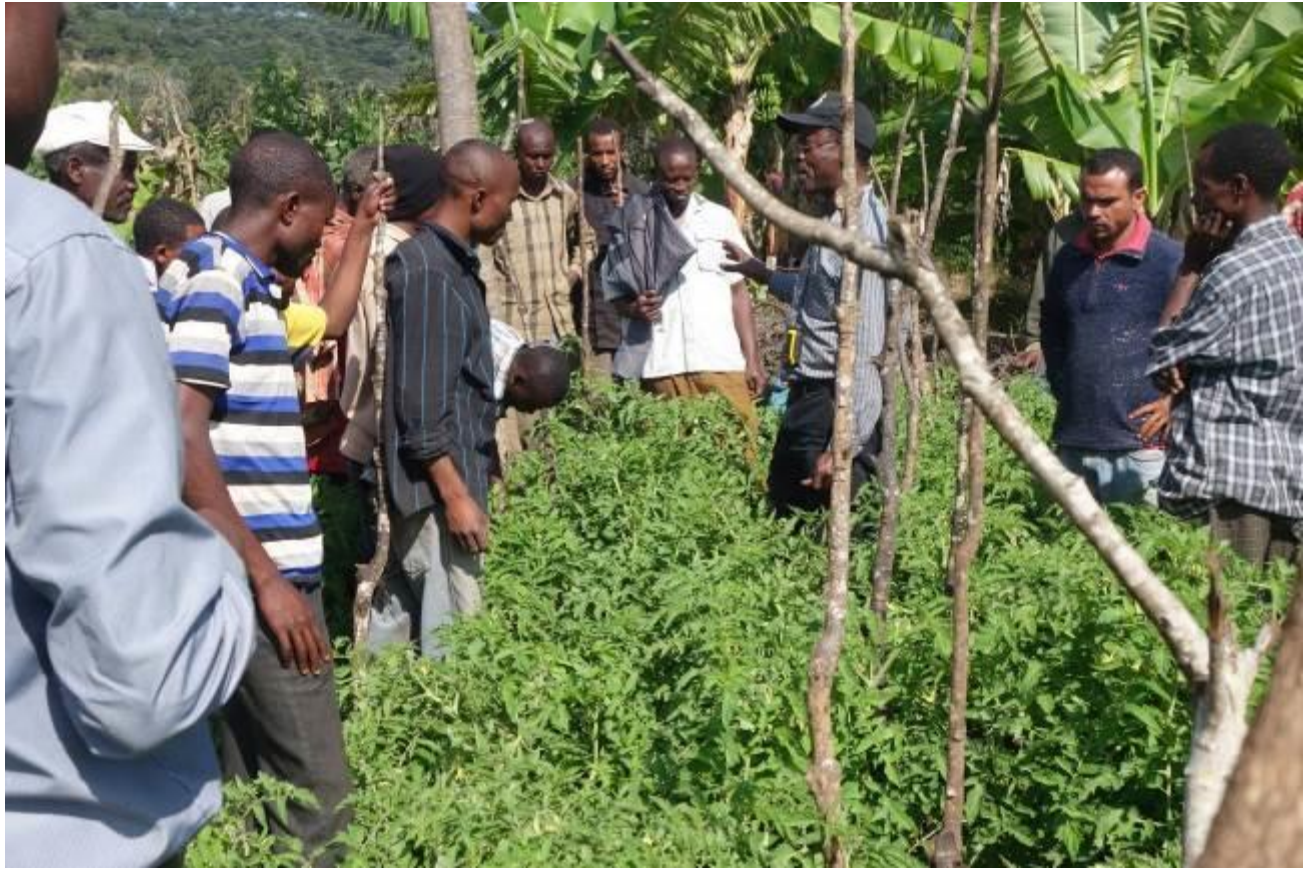
Work on an electronic decision support tool to aid with weed management was also done in the first year. The model for this tool was completed in the past year and is composed of four “layers”. The first layer contains 19 “characterizations” based on “environment” and “weed category” and 47 weed management options. The weed management options were grouped into three categories: management practices that can be applied prior to the season, management practices during the season, and practices after the season. The second layer is partitioned in two parts: “general weed advice” and a “herbicide guide”. This layer presents detailed instructions on application (e.g., timing, product/technology, mode of operation) for all the 19×47 combinations (if relevant) from the first layer. A third layer with 29 budget and resource “characterizations”, divided over “available land”, “available resources”, “available inputs”, and “available budget” then serves as a filter that will be applied to the 19×47 combinations of layer 2. This will result in a limited number of feasible and locally adapted options generated in layer 4. Currently the programmers of Co-capacity, a private enterprise, are working on the generation of the first prototype of the decision support tool and it is expected to be ready during the course of the second year of the project.

Other activities done by the rice team in the past year include: (i) assessing the *efficiency of foliar sprays under different rice growing conditions and their economic implication to rice farmers*. This involved establishment of 30 on-farm demonstrations in Kilombero (irrigated and rainfed rice growing conditions) and Morogoro (upland rice growing condition). To capture the efficiency of foliar

nutrients in rice under different rice growing environments, the demonstrations were conducted in three different major rice growing environments: 1) irrigated lowlands, 2) rainfed lowlands, and 3) rainfed uplands; (ii) *farmer-participatory on-farm Good Agricultural Practices (GAP) demonstration in Kilombero*: This activity was undertaken in partnership with KATRIN-ARI. Four GAP component technologies were introduced to 30 farmers in the five villages of Lungongole, Kiberege, Lumemo, Michenga, and Sagamaganga in Kilombero District. There were six demonstrations per village. The four GAP components introduced and demonstrated were; 1) bunding and leveling; 2) use of certified seed (variety - SARO5; 3); line planting; and 4) soil fertility management using optimum use of NPK fertilizer.

4.3 Demonstration of vegetable technologies and management practices

During the past year, the vegetables team was operational in four districts: Babati (Maweni, Endadosh, and Sagara villages), Kiteto (Kibaya secondary school and Sunya and Kaloleni villages), Kongwa (Chamkoroma, Tubugwe, and Songambebe villages), and Kilombero District (Msufini, Ichonde, and Kisawasawa). The approach used by the vegetables team which comprises AVRDC, HORTI-Tengeru, District Agriculture staff, village extension officers, and NAFAKA staff is as follows: after village selection, the project team commences with season-long training comprising community sensitization meetings, nursery management trainings, GAP training including integrated pest management (IPM), postharvest training, and food safety/cooking show/organoleptic testing activities as well as field days. Seed kits and other vegetable production equipment are also provided to group leaders. The demonstration plots established as part of this project measure 160 m² (20 m × 8 m) and are planted with six different varieties of vegetables: one tomato variety (Tengeru 2010), two African eggplant varieties (DB3 and Tenderu White), one African nightshade variety (Nduruma), amaranth (Madiira I), and jute mallow (SUD 2).



Vegetables team conducting an integrated pest management training Kongwa District in Dodoma Region
(Photo: Hassan Mndiga/AVRDC)

4.4 Postharvest management and nutrition

Postharvest loss is one of the main constraints of value chain productivity in Tanzania. The project team conducted a baseline survey in the districts of Kongwa, Kiteto, and Mvomero at the beginning of the project year. Results indicated that (i) losses of grain and legumes during harvesting ranged between 20 and 40%; (ii) losses during shelling were up to 5%, even when the amount of grains shelled per day was very small due to drudgery and lack of improved shelling technologies; and (iii) losses during storage ranged between 15 and 25%, but could go up to 90% with the grain borer as the main pest. Use of pest control chemicals, besides being expensive and a potential health hazard, was not always successful because of counterfeit agroinputs on the market.

To help address postharvest management constraints, the project team trained lead farmers and also conducted demonstrations on postharvest handling of maize (shelling, drying, storage, and processing of maize). This activity focused on improving the skills of smallholder farmers to reduce postharvest losses of crops. Specifically shelling, proper drying, and storage technologies were introduced to farmers in the three districts of Mvomero, Kongwa, and Kiteto. These included maize shellers (motorized—diesel-run and electric), a collapsible drier case, and hermetic storage bags (PICS bags,

grain safe bags). Six villages where NAFKA and other project teams are present (two villages in each district) were selected for the training sessions and demonstrations. In Kongwa District (Ndurugumi and Vihingo villages), 77 lead-farmers were trained (49 men and 28 women). In Kiteto District (Kiperesa and Ngipa villages), 43 farmers were trained (14 men and 29 women) while in Mvomero District (Kwadoli and Dihinda villages) 41 farmers were trained (21 men and 20 women). The lead-farmers were trained on the use of the small-scale, mobile shelling machine (500 kg/hr capacity), use of collapsible drying cases for safe drying of maize, and storage of maize in hermetic bags. In order to enhance the chances of adoption, 12 shelling machines, six drying cases, and 316 hermetic bags were distributed to lead farmers in all the six villages in Kongwa, Kiteto, and Mvomero districts.



Farmers in one of the project villages being trained on how to use the motorized maize sheller (Photo credit: Shabani Ibrahim/IITA)

4.5 Field days

As a means of sharing project results with participating farmers and other stakeholders, field days were organized in a number of project districts by the maize and vegetables teams (Table 2). In all cases, local government staff, research staff from agricultural research institutes, input dealers, and the media attended as a sign of support for the project activities and a strategy for scaling and sustainability. During field days, seed kits were distributed to farmers to enhance the potential for adoption and scaling.

Table 2: Information on field days held for the various project components

Project component	Location/District	Date of field day	Number of participants
Maize	Ngipa/Kiteto	4 June 2015	202
	Ndurugumi/Kongwa	8 June 2015	104
	Riroda/Babati	28 May 2015	85
	Gallapo/Babati	30 May 2015	125
	Kitete/Kilosa	10 June 2015	383
	Ng'ole/Kilosa	11 June 2015	141
	Ulaya/Kilosa	12 June 2015	178
	Magua/Kilosa	13 June 2015	278
Vegetables	Sangara/Babati	August 2015	49
	Songambe/Kongwa	August 2015	41
Total participants			1586



Farmers participating in farmer field days activities in Kiteto District

(Photo credits: James Mabuga/ ARI Hombolo)

4.6 Community empowerment

The project works with NAFKA as a scaling platform. The NAFKA project has developed a vibrant network of farmers' groups and associations, farmer trainers (VBAs and lead farmers), local development organizations, private sector actors, and input suppliers with which the project works. However, in districts such as Kilosa and Babati where the NAFKA project is not present, the project team has developed the capacities of farmers and input suppliers to fill the gap resulting from NAFKA's absence. In some situations, the teams have conducted baseline studies to inform better community empowerment. For instance, the postharvest team conducted a baseline study whose results have been shared in section 3.4. The vegetables team also conducted a baseline study in Kongwa, Kiteto, and Babati districts covering 360 farmers from all the nine pilot villages. The survey aimed at providing information on the importance of leafy vegetables for farmers, farmers' access to inputs, finance and markets, as well as the role of women, men, and youth in production, management, and sale of vegetables. This survey will form a basis for a follow-up survey scheduled for 2017, in which the adoption of the technologies introduced will be assessed. In addition to the 360 farmers, 86 traders were also interviewed to access information on leafy vegetable value chains and handling of leafy vegetables after leaving the farm gate. The information generated from the baseline survey will directly feed into the project activities of the second project year.

The rice team conducted baseline studies as well as other activities in the empowerment category as highlighted below: baseline and diagnostic surveys to inform value chain enhancement were conducted. In addition, value chain training was conducted for 34 actors—farmers, processors, traders, agro-dealers, and rice component partners—11 of whom were women. Three main training blocks were covered in the workshop: (1) the meaning and essence of value chains: definitions, attributes, and key elements; (2) analyzing value chains: value chain mapping, value addition and attribution and market assessment, and critical success factors; and (3) upgrading strategies on product, processes, functions, and markets in value chains: rice experimental auction results, packaging and branding, quality standards, and contract farming. Participants also conducted fieldwork to identify constraints and opportunities for growth and learning from peers in the field. The entities visited included Dakawa Rice Scheme—Uwawakuda Cooperative Society; Intermech Ltd that manufactures farming and postharvest equipment; Agricultural Seed Agency (ASA), and Mambo ya Yesu Ltd, a processing company. Finally, experimental auctions were conducted in Morogoro in April and were attended by 131 participants (83% women) who were randomly selected from two open-air local markets (Mawenzi and Morogoro). During the experimental auctions, four rice samples were assessed. These included two local varieties: SupaKyela, a variety widely known by consumers, and Mbawambiri, a variety that is grown by many farmers but largely unknown in the market. The third sample was an improved aromatic rice variety (IR05 N221) that is prone to a comparably higher breakage rate, and the fourth was the low quality rice in terms of visual appearance resulting from poor postharvest handling. This fourth variety was used as the benchmark. The structure used in the experimental design was the Vickery 2nd auction within which a winner who proposes the highest price pays the second highest bid. Nine sessions were held; each session included 15 participants (except for the first session that comprised 11 participants). In each session, four rounds of assessing consumer's willingness to pay were conducted; three individual trials and a collective round. The individual trials involved the assessment of the willingness to pay by each participant of the uncooked rice, the cooked rice, and a final individual assessment after the

collective round. The collective round involved a discussion and consensus on the willingness to pay by the group made up of randomly assigned participants.

4.7 Problems and challenges

There were general challenges that affected realization of targets for the entire project. Six key challenges can be noted.

1. The beginning of the project was quite time-restrictive in terms of meeting the necessary institutional requirements and logistical preparations for technology delivery with a fast approaching rainy season. This caused problems with respect to some project partners planning and working together due to the short time between approval of the project and starting of the planting season,
2. The project was designed in such a way that NAFKA is a scaling platform whereas Africa RISING is a technology platform. In districts (Kilosa and Babati) where NAFKA is not operational, it proved hard at the beginning to set up a scaling platform. The solution was to work with the district agriculture officers and seed supply companies to co-manage the demos with farmers as well as train farmers. Commitment of these two institutions was satisfactory with room for improvement.
3. The postharvest team also had constraints filling the gap left behind by the TUBOCHA project. To fill this gap, the team identified two local staff familiar with previous TUBOCHA work to link with the beneficiaries in the districts. This took a while to facilitate.
4. The condition of rural infrastructure, especially roads, was challenging at the beginning and it affected implementation and monitoring of project activities during the first and second quarters of the project. However, in the third quarter onwards, most of the problem roads were repaired.
5. Rain distribution was poor and it affected performance of the demonstration plots. For some locations such as vegetable sites in Babati District, the plots were flooded. In other locations, such as maize sites on Kongwa and Kiteto, the plots dried up. For maize demonstration plots, despite the threat of drought, the improved varieties performed better local varieties as reported by one farmer in one of the success stories (Success story I).
6. In some locations, the relatively poor group governance and dependency syndrome affected project execution. In addition, although village extension staff are available, many are not willing to work with farmers yet. The plan is to have them on board as a scaling strategy.

4.8 Planned activities

At general project level, the following activities will be conducted next year:

- Selection of sites for the new project locations in Mbeya and Iringa regions and establishment of project demonstration sites as well as farmer training in these locations. All project teams will also select and implement new demonstration sites in the original regions (Morogoro, Manyara, and Dodoma) to enhance scaling as well as maintain the old sites.
- A series of meetings: community sensitization meetings, stakeholders' meeting, review and planning meetings, and project management team meetings will be held at appropriate dates to ensure smooth project implementation.
- Training of farmer trainers (both village based and partner organizations) in specific subjects

- to ensure quality project implementation.
- Farmer field days and exchange visits will also be conducted.
- A number of studies: baseline in the new project locations and adoption studies after planting (this will be done by the project coordination team) will be done during the first and second quarters of the project.
- Estimation of project spillovers will also be planned and executed in the second year of the project.
- Formation of R4D/Innovation platforms to ensure swift and timely action on issues that facilitate or hamper scaling of the agricultural productivity interventions.
- A project writeshop will be conducted during the second or third quarter for team members to generate different knowledge and communication products.

Additionally each of the teams will conduct unique activities not similar to other project components. The **vegetables** team will elicit feedback from all nine previous pilot sites in Manyara, Morogoro, and Dodoma Regions to strengthen the current training approach in general and prepare further training activities in the latter villages based on current needs. The team will also conduct first market access training activities in three of the nine pilot villages in Manyara and Dodoma regions. The **rice** team will develop prototypes for the weeder and weed management advice tool. The **maize** team produced a crop production field guide and a crop production master plan for maize and selected legumes for utilization by farmers and partner staff in the scaling activities. For the **postharvest** team, a scaling strategy for the technologies will be developed. Also, a training manual on mechanical shelling and improved storage of maize and legumes will be developed. This manual will help farmers to understand and get more informed regarding harvesting, drying, processing, and storage of maize and legumes. At least 15 recipes for complementary foods to be used in project locations will be developed and service providers trained on their use. At project coordination level, two GIS-related activities will be done. The first activity will involve identification of recommendation domains (RDs) for scaling single best-bet technologies and integrated technology packages (combination of several technologies). Sub-activities will include: (1) updating the project geo-database with new GPS locations, and biophysical and socioeconomic variables; (2) generating maps on spatial distribution of implemented technologies (where and what is happening); (3) finalize success criteria for adoption of different technologies by identifying variables critical to success/failure of each technology based on literature review, and local and expert knowledge; and (4) geospatial analysis to generate RDs for single and integrated best-bet technologies packages. Spatial monitoring and evaluation will be the second activity and it will involve implementation of a spatial monitoring tool using GSM mobile networks and generation of descriptive statistics on number of farmers/hectares in mother, child, and grandchild pilot sites based on administrative regions.

5 MONITORING AND EVALUATION

A number of monitoring and evaluation activities have been implemented in the past year.

5.1 Project monitoring and evaluation framework

A draft monitoring and evaluation framework (MEF) was developed by the project team leader (technology scaling specialist - TSS). The MEF highlights the impact pathway as well as the link between the development objectives and result areas of the USAID mission in Tanzania and this project. It further provides key performance management tasks associated with maintaining and updating the MEF. It details schedules for data collection, special studies, and eventual project evaluations (internal and external; mid-term, and end-term). Finally it highlights program review processes (e.g., Annual Portfolio Review to help track progress of interventions among the partners, and Data Quality Management for all tracked indicators) as well as the plan (main activities to be undertaken as part of monitoring and evaluation) and project indicators (both from the Feed the Future indicators and custom/management indicators). The MEF document will be finalized in the first quarter of year 2 and will form a blueprint for M&E activities in the project.

5.2 Training in PMMT and FTFMS

Two members of the project coordination team (the TSS and postdoc GIS specialist) were trained on how to use the Africa RISING Project Mapping and Monitoring Tool by an IFPRI scientist in Arusha, Tanzania. By the end of the training, the participants were able to enter and report data on FtF and custom indicators.

5.3 Review meetings

The project has been holding review meetings at project and team level to ensure timely monitoring about project progress. Details of the meetings are indicated under the project management section.

5.4 Operationalization of data management and reporting

To operationalize data management and reporting, a project database is being developed with the support of IFPRI. With support from NAFKA M&E staff, refinement of the database as well as developing tools (data collection forms) for the various indicators was initiated and will be finalized at the beginning of year 2. The project has already procured Internet enabled tablets which will be used by the project implementation team to collect and report data in a timely manner.

5.5 Performance against PMP indicators

During the current year, data on output indicators and some outcome indicators has been reported. After one full cycle of implementation, data on all project outcomes will be generated and reported since farmers will then be expected to have adopted what they learned from the project activities during the previous year/planting season. Table 3 provides an overview of the indicator performance.

Table 3: Project performance against PMP indicators

Indicator	FY Target	FY Achievement	% FY Achievement	% Female	% Male
1. Number of farmers and others who have applied new technologies or management practices as a result of USG assistance	625	252	40	53.2	46.8
2. Number of rice hectares under improved technologies or management practices as a result of USG assistance	580	30	5.1		
3. Number of individuals who have received USG supported short-term agricultural sector productivity or food security training	725	966	133.2	39.6	60.4
4. Number of food security private enterprises (for profit), producers organizations, water users associations, women's groups, trade and business associations, and community-based organizations (CBOs) receiving USG assistance	71	42	59		
5. Number of rural households benefiting directly from USG interventions	775	1366	176.2	44.9	55.1
6. Number of beneficiaries with home gardens or alternate crops as a proxy for access to nutritious foods and income	149	797	534.9	44.2	55.8

As indicated in Table 3, 40% of farmers are applying technologies and only 5% of rice hectares are under improved technologies. These being outcome indicators, performance is expected to immensely increase during the next year. For other indicators which are output oriented, 133.2% of individuals have received food security training, 59% of private enterprises and farmers' organizations are receiving USG assistance, 176.2% of rural households are benefiting, and over 300% of target households have home gardens as a result of this project. For all the achievements that are over 100% the results are largely attributed to activities of the vegetables and maize teams whose approach involves training farmers and giving them seed kits.

6 MANAGEMENT AND STAFFING

A number of project management meetings including planning and review sessions were held at project and component levels. The project has a wiki page at this link: http://africa-rising.wikispaces.com/AR_NAFAKA_TUBOCHA_Project. The key project level meetings held during the past year and all posted at the wiki page include:

- Inaugural meeting of the project management team held on 29 October 2014 in Dar es Salaam.
- Project inception workshop held from 30 to 31 October 2014 in Dar es Salaam. The workshop was attended by 32 participants from partner institutions.
- Quarterly project review meeting held from 31 March to 1 April 2015 in Morogoro.
- Annual review and planning meeting held from 8 to 10 July 2015 in Dar es Salaam to review progress and plan for the second year of the project (2015/16) (http://africa-rising.wikispaces.com/AR-NAFAKA-TUBOCHA_rev%26plan_July2015).
- Project management team meeting held on 10 July 2015 in Dar es Salaam (<http://africa-rising.wikispaces.com/file/view/PMT%20meeting%20minutesI%20-%201310.doc/562249287/PMT%20meeting%20minutesI%20-%201310.doc>).
- Scoping visit to Mbeya and Iringa regions to prepare for project expansion in the second year, held from 17 to 28 August 2015 (<http://africa-rising.wikispaces.com/Mbeya+%26+Iringa+scoping+visit>).
- Specific component meetings are also available at the wiki page.

Regarding staffing during the past year, three vacant positions were filled. The project technology scaling specialist joined in mid-February 2015 and is embedded within the NAFKA project offices at Morogoro. The GIS postdoc joined in June 2015 and is based at IITA offices in Arusha. The Communication Assistant joined in January 2015 and operates from Arusha IITA offices. Table 4 shows the project staffing by project component (coordination, maize/legumes, rice, and postharvest).

Table 4: Project team composition

Name	Gender	Institution	Disciplinary expertise	Qualification	Project role
Coordination					
M. Bekunda	M	IITA	Chief Scientist/Agronomy	PhD	Management
H. Sseguya	M	IITA	Technology Scaling/socio-economist	PhD	Project Leader/Coordinator
S. Feleke	M	IITA	Economist	PhD	Implementation
F. Kamau	M	IITA	GIS	PhD	Implementation
G. Ndibalema	F	IITA	Research communication	BA Mass Comm.	Implementation
S. Mruma	M	NAFAKA	Horticulture	MSc	Implementation
V. Mgoo	M	NAFAKA	Agronomy	MSc	Implementation
Maize team					
B. Jumbo	M	CIMMYT	Breeder	PhD	Team leader
A. Kimaro	M	ICRAF	Soil Fertility	PhD	Implementation
V. Uzokwe	F	IITA	Agronomy	PhD	Implementation
F. Baijukya	M	IITA	Agronomy	PhD	Implementer
F. Kizito	M	CIAT	Land/water management	PhD	Implementation
J. Kihara	M	CIAT	Agronomy	PhD	Implementation
Z. Mduruma	F	Aminata Seeds Company	Breeder (seed producer)	PhD	Implementation
G. Chacha	M	Meru Agro Seed company	Seed producer/trader	MSc	Implementation
E. Swai	M	ARI Hombolo	Soil Fertility	MSc	Implementation
J. Mabuga	M	ARI Hombolo	Agronomy	BSc	Implementation
Y. Luhenda	M	ARI Selian	Agronomy	BSc	Implementation
Rice team					
J. Rodenburg	M	AfricaRice	Agronomy/Weed Science	PhD	Team leader
S. Kalimuthu	M	AfricaRice	Agronomy	PhD	Implementation
G. Mujawamariya	F	AfricaRice	Value-Chain	PhD	Implementation
J. Mghase	M	KATRIN	Agronomy	PhD	Implementation
D. Tippe	M	ARI Uyole	Scientist	PhD	Implementation
G. Mwinama	M	CARMATEC	Engineer		Implementation
P. Bindraban		IFDC	Scientist		Implementation
J. Lieshout		Co-Capacity	Scientist		Implementation
P. Chisawillo	M	Intermech	Scientist		Implementation
Vegetables team					
A. Gramzow	M	AVRDC	Economics	PhD	Team leader
H. Mndiga	F	AVRDC	Agronomy/training	MSc	Implementation
M. Tilya	M	HORTI -Tengeru	Agronomy	MSc	Implementation
N. Nenguwo	M	AVRDC	Post-harvest specialist	MSc	Implementation
T. Stoilova		AVRDC	Genetic resources	PhD	Implementation

			spec.		
R. Marealle	F	AVRDC	Post-harvest	BSc	Implementation
P. Joseph	M	AVRDC	Agribusiness	BSc	Implementation
Postharvest management team					
A.Abass	M	IITA	Postharvest specialist	PhD	Team leader
I.Shabani	M	IITA	Food technologist	MSc	Implementation
G. Michael	F	IITA	Food technologist	BSc	Implementation
K. Mwinyigoha	M	IITA	Lab analyst	BSc	Implementation
E. Kabula	F	IITA	Statistician	BSc	Implementation
G. Ndunguru	M	True Foods Co.	Food Technologist	PhD	Implementation
W. Mwakyami	M	TSSPMP	Food Technologist	PhD	Implementation
L.H. Kyungu	F	COUNSENUH	Nutritionist	PhD	Implementation

Changes in staffing are expected as follows:

For the maize team, with expansion into Iringa and Mbeya regions, two agronomists will be recruited to work alongside NAFKA region(al) coordinators. For the vegetables team, Mr Nenguwo will be replaced by an agronomist. For the rice team, leadership of the team will change from Dr Rodenburg to Dr Kamanda. The postharvest management team plans to work with the Zonal Extension and Information Liaison Officer for Eastern Tanzania at ARI Ilonga who has a background in postharvest management as a food technology and agricultural engineering staff at Mbeya University of Science and Technology (MUST).

7 BUDGET

IITA has been submitting quarterly financial reports to USAID Tanzania. The report for the period July to September 2015 is under preparation.

A total of USD2, 200, 000 has been received for year I implementation of the project. An unspent balance of approximately USD147, 000 is expected to remain per 30 September 2015. However, IITA still has commitments with partners (CIMMYT and AfricaRice) for FYI of USD72,000. These will be disbursed after receipt of the financial reports from the partners.

There has been a delay in implementation of some activities like farmer training and post-season technology assessment due to uncompleted harvest activities by end of the reporting period. These are re-scheduled for October and November 2015.

The unspent funds will be added to the new incoming funds from USAID and used in FY2.

8 OTHER ISSUES

8.1 Activities undertaken to ensure sustainability and transition

A draft project scaling strategy was developed recently and sustainability is one of the main focus actions for this project. Key activities undertaken to realize this include:

- Working with national agricultural research institutions and District Agricultural and Irrigation Offices (DAICOs).
- Identifying NGOs with a long-term presence and attachment in locations where we work or plan to work (e.g., Maendeleo ya Watu wa Kilolo–MaWaki) and engage with them in the work of this project.
- Developing the capacities of farmer leaders, VBAAAs, and farmers' groups and associations (NAFAKA as lead) and connecting them to other actors in the value chain (agroinput suppliers, traders, and processors).
- Initiating R4D/Innovation platforms such that emerging issues that affect agricultural productivity are acted upon in a systematic way.

8.2 Coordination with host Government and local partners

The project coordinates with officials from the Tanzania Ministry of Agriculture, Food Security and Cooperatives (MAFSC) through organizing visits by key officials. However, during the next year, we plan to provide bi-annual updates to DAICOs to enhance coordination and close-out. During key project activities such as field days and training sessions, DAICO and ARI staff are actively engaged in the activities as members of the project team. The field extension staff are also trained in agronomic practices during the time when they are being prepared to co-manage the demonstration plots, postharvest machinery, weeders, and other technologies.

9 SUCCESS STORIES

See the following success stories in an accompanying separate attachment with this report.

- **Success Story 1:** I harvested 60 bags of maize despite severe drought
- **Success story 2:** A healthy veggie revolution growing in Tanzania
- **Success story 3:** Tanzanian farmer cashes in on new tomato variety
- **Success story 4:** Saving on labour and cutting food losses

A healthy veggie revolution growing in Tanzania

African nightshade introduced to improve nutrition and income



A female farmer from Sunya village in Manyara region holds a bundle of African nightshade harvested from the Africa RISING-NAFKA-TUBORESHE CHAKULA scaling project's demonstration plots. African nightshade is rich in Vitamin A and micronutrients.

Photo credit: Hassan Mndiga/AVRDC



Farmers in Sunya village harvesting the African nightshade variety 'Nduruma' introduced to the community by the World Vegetable Center (AVRDC) and HORTI-Tengeru under the Africa RISING-NAFKA-TUBORESHE CHAKULA scaling project.

Photo credit: Hassan Mndiga/AVRDC

Telling Our Story

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When Omary Poputo tasted the African nightshade for the first time, he said: "I have neither seen nor tasted this vegetable before, but for sure it is definitely one of the best leafy vegetables I have ever tried."

Omary hails from Sunya village located in Kiteto District, central Tanzania and is one among the 152 lead farmers spearheading a nutritious veggie revolution in this rural community in central Tanzania with the help of staff working on the [Africa RISING – NAFKA and TUBORESHE CHAKULA scaling project](#) funded by USAID.

Through the project, farmers in nine villages located in Manyara and Dodoma regions of Tanzania have been introduced to Amaranth and African nightshade farming. From the 152 initial vegetable farmers who were trained by the project as "lead farmers"; the project has had a multiplier effect and in the process attracted nearly five times the number of initial farmers in both regions to start growing Amaranth and African nightshade. Currently over 650 farmers are engaged in growing these two nutritious vegetables.

Why Amaranth and African nightshade? The two vegetables are much richer in Vitamin A and micronutrients like iron than the most wide-spread leafy vegetables in Tanzanian villages like the Chinese cabbage and Ethiopian mustard. Deficiencies of in particular Vitamin A can cause night blindness for adults and may reduce bone growth for children. Increasing the intake of Vitamin A is therefore an important objective in Africa in general and Tanzania in particular. According to UNICEF one third of children under the age of 5 are vitamin A deficient in Tanzania and conversely 130 children die every day in the country because they are malnourished.

For Omary, it is the sweet taste of the nightshade variety called 'Nduruma' that convinced him this was a good vegetable variety that could be enjoyed by all in the family; especially children under five years who require high Vitamin A intake. Farmers on the other hand appreciate the drought tolerance abilities of 'Nduruma'.

Omary notes that: "this high drought tolerance capability coupled with the lovely taste enables 'Nduruma' to become a variety that might just soon replace other more popular but less nutritious vegetable varieties".



I harvested 60 bags of maize despite severe drought

The success of a female farmer inspires change and interest among her peers



Mashehe Salum

Photo credit: Shabani Ibrahim/IITA



Mashehe Salum in her farm. She hopes to get better harvests this year too.

Photo credit: Shabani Ibrahim/IITA

Mashehe Salum is a small scale maize and legume farmer in Ngipa village, Kiteto District in central Tanzania. Four years ago, maize yield from her 4 acre farm was barely enough to feed her family of five. She knew she could get more from her farm, but didn't know what to do improve her farm productivity.

Mashehe's farm is located in a semi-arid region with low and erratic rainfall. So water access was a significantly big challenge to her farming endeavor. And just like other farmers in Ngipa village, she also planted recycled seeds. Year after year, she would use the broadcasting technique to plant her maize and year after year the result would be the same –poor harvest, not adequate to feed her family.

But Mashehe's story today is a stark contrast to her story 4 years ago. She has become a model farmer for her colleagues after she harvested a whopping 60 bags of maize while her fellow farmers were once again deprived off any significant harvests, thanks to a severe drought that affected Kiteto district last year.

According to Mashehe, her life changed the moment she decided to participate in the [Africa RISING-NAFAKA-TUBORESHE CHAKULA scaling project's](#) demonstration farms. She was one of beneficiaries of a training on climate-smart farming in Kteto District they received trainings various good agronomic practices and soil water conservation strategies in semi-arid areas like Kiteto.

"We received training on planting drought resistant maize varieties, line spacing, fertilizer application and use of tied-ridges to conserve soil water. I implemented all the best practices we were trained on and I am grateful it has paid off in such a big way!" she says with a bright smile. "My fellow farmers wondered if I used "uchawi" (magic) in my farm since it remained green while others were drying," she adds.

Mashehe asserts that, "the higher yields from my farm were largely due to use of tied-ridges that held the little available rain water for longer period". This meant that soils were wetter for longer periods compared to neighboring farms that used flat planting.

"This time the yields are more than enough to feed my family! I intend to apply the postharvest best practices were trained on to store them and sell at the right price in order to generate school fees for my children," she explains.

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After seeing Mashehe's success, neighboring farmers are now eager to also learn the new techniques. Mashehe notes that, "Prior to the Africa RISING-NAFAKA-TUBORESHE CHAKULA scaling project, only a few villagers were interested in attending farmers' meetings, but today because they can see the benefits firsthand, mobilizing them has become relatively easy. They are now eager to learn and use the new knowledge to get better harvests from their farms."

The previous farmer's field day organized by the Africa RISING-NAFAKA-TUBORESHE CHAKULA scaling project in Ngipa village was attended by over 200 farmers. Mrs. Mashehe adds that, "this level of attendance was historic since it has never been witnessed before in Ngipa village. Even farmers from neighboring villages attended!"

The Africa RISING-NAFAKA-TUBORESHE CHAKULA scaling project is working to introduce farmers in Kongwa and Kiteto districts in Tanzania to simple seasonal in-situ water-harvesting innovations such as tied ridges, planting pits and trash lines, combined with contour planting to reduce the consequences of both heavy rainfall and short-term drought. The on-going work also integrates other aspects like nutrient management and improved maize seed varieties that are sensitive to low soil moisture. It is anticipated that this work will ensure 47,000 farmers can be able to adopt these practices through this initiative.